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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,787	12/02/2003	Michael J. Koster	SUN-P8985-SPL	6112

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EXAMINER

BARTON, JONATHAN A

ART UNIT

PAPER NUMBER

2186

DATE MAILED: 02/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/726,787	KOSTER ET AL.	
	Examiner	Art Unit	
	Jonathan Barton	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12/2/2003</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities:
 - a. Line 2 should read "broadcast an update **to** other caches".
 - b. Lines 2-3 should read "when the given cache **line** is updated in a local cache". *Appropriate correction is required.*

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claim 7 recites the limitation "the shared memory multiprocessor" in line 1.

There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 8-12, 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Manasse (US 5,345,578).

- a. As for claims 1, 10, 19 and 20 Manasse discloses

- i. initializing a cache to operate using a write-invalidate protocol (Col. 6 Lines 62-66 - Manasse initializes to operate using a write-broadcast protocol, but since his invention switches between the two protocols as needed, the initial protocol chosen does not constitute patentable subject matter.);
 - ii. monitoring a dynamic behavior of the cache during program execution (Col. 6 Lines 52-59); and
 - iii. switching the cache to operate using a write-broadcast protocol if the dynamic behavior indicates that better performance can be achieved using the write-broadcast protocol (Col. 6 Lines 42-45, Col. 14 Lines 45-47).
- b. As for claim 2 and 11 Manasse discloses
 - iv. monitoring the dynamic behavior of the cache involves monitoring the dynamic behavior of the cache on a cache-line by cache-line basis (Col. 5 Lines 4-6, Col. 6 Lines 52-62).
- c. As for claim 3 and 12 Manasse discloses
 - v. switching to the write-broadcast protocol involves switching to the write-broadcast protocol on a cache-line by cache-line basis (Col. 5 Lines 4-6, Col. 6 Lines 42-45, Col. 14 Lines 45-47).
- d. As for claim 8 and 17 Manasse discloses

- vi. the write-invalidate protocol sends an invalidation message to other caches in a shared memory multiprocessor when a given cache line is updated in a local cache (Col. 2 Lines 4-15).
- e. As for claim 9 and 18 Manasse discloses
 - vii. the write-broadcast protocol broadcasts an update other caches in a shared memory multiprocessor when the given cache is updated in a local cache (Col. 2 Lines 16-29).
- f. As for claim 19 Manasse additionally discloses
 - viii. a plurality of processors, wherein a processor within the plurality of processors includes a cache (Col. 3 Lines 27-29, Col. 2 Lines 46-48);
 - ix. a shared memory (Col. 3 Lines 20-22);
 - x. a bus coupled between the plurality of processors and the shared memory, wherein the bus transports addresses and data between the shared memory and the plurality of processors an initializing mechanism configured to initialize the cache to a write-invalidate protocol (Col. 3 Lines 7-9, Col. 4 Lines 29-31).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4-7 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manasse (US 5,345,578) in view of Rand (US 2003/0126372).

g. As for claim 4 and 13 Manasse fails to disclose the following limitation, which is disclosed by Rand:

xi. monitoring the dynamic behavior of the cache involves maintaining a count for each cache line of the number of cache line invalidations the cache line has been subject to during program execution (Par. 45).

xii. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the invalidation count of Rand with the snoop protocol switching invention of Manasse because both systems are intended to aid and improve cache coherency and the invalidation count would give further data and control to operate Manasse's system.

h. As for claim 5 and 14 Manasse discloses

xiii. if the number of cache line invalidations indicates that a given cache line is updated frequently, switching the cache line to operate under the write-broadcast protocol (Col. 6 Lines 59-66).

i. As for claim 6 and 15 Manasse discloses

xiv. if a given cache line is using the write-broadcast protocol and the number of cache line updates indicates that the given cache line is not being contended for by multiple processors, switching the given cache line back to the write-invalidate protocol (Col. 6 Lines 42-45, Col. 14 Lines 45-47).

j. As for claim 7 and 16 Manasse discloses

xv. If the shared memory multiprocessor includes modules that are not able to switch to the write-broadcast protocol, the method further comprises locking the cache into the write-invalidate protocol (Col. 2 Lines 33-44).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

k. Chauvel et al. (US 2002/0065992).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Barton whose telephone number is 571-272-8157. The examiner can normally be reached on Monday - Friday 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2186

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jonathan Barton
Examiner
Art Unit 2186

A handwritten signature in black ink, consisting of stylized, overlapping loops and curves, positioned to the right of the printed name.

JB

A handwritten signature in black ink, featuring a series of fluid, connected strokes that form a cursive-like script, positioned above the printed name.

MATTHEW D. ANDERSON
PRIMARY EXAMINER